I CLAIM:

1. An apparatus for converting a differential in thermal energy between a first thermal source having a thermal conducting fluid and a second thermal source having a thermal conducting fluid, the apparatus comprising:

- a first vessel for containing a gas under pressure, the first vessel being in fluid communication with said first and second thermal sources;
- a second vessel for containing a gas under pressure, the second vessel being in fluid communication with said first and second thermal sources;
- a plurality of cooperating valves for regulating a flow of thermal conducting fluid from the first and second thermal sources to the first and second vessels, the plurality of cooperating valves alternating between first and second operating positions, the plurality of cooperating valves permitting a flow of thermal conducting fluid from the first thermal source to the first vessel and from the second thermal source to the second vessel in first operating position, the plurality of cooperating valves preventing a flow of thermal conducting fluid from the first thermal source to the second vessel and from the second thermal source to the first vessel in the first operating position, the plurality of cooperating valves permitting a flow of thermal conducting fluid from the first thermal source to the second vessel and from the second thermal source to the first vessel in the second operating position, the plurality of cooperating valves preventing a flow of thermal conducting fluid from the first thermal source to the first vessel and from the second thermal source to the second vessel in the second operating position;
- a pressure driven actuator in fluid communication with the first and second vessels whereby the actuator is driven into reciprocating motion between a first position and a second position by alternating positive pressure and negative pressure from the first and second vessels wherein positive pressure from the first vessel coupled with negative pressure from the

second vessel when the plurality of cooperating valves is in the first operating position drives the actuator to the first position and negative pressure from the first vessel coupled with positive pressure from the second vessel when the plurality of cooperating valves is in the second operating position drives the actuator to the second position.

2. An apparatus according to claim 1 further comprising a first heat exchanging conduit located in the first vessel and a second conduit located in the second vessel, the first heat exchanging conduit having a first end for receiving fluid from said first and second thermal sources and a second end for re-circulating fluid to said first and second thermal sources, the second heat exchanging conduit having a first end for receiving fluid from said first and second thermal sources and a second end for re-circulating fluid to said first and second thermal sources.

3. An apparatus according to claim 2 wherein the plurality of cooperating valves comprises:

- a first valve located between the first thermal source and the first end of the first heat exchanging conduit;
- a second valve located between the second end of the first heat exchanging conduit and the first thermal source;
- a third valve located between the second thermal source and the first end of the second heat exchanging conduit;
- a fourth valve located between the second end of the second heat exchanging conduit and the second thermal source;
- a fifth valve located between the second thermal source and the first end of the first heat exchanging conduit;
- a sixth valve located between the second end of the first heat exchanging conduit and the second thermal source;

- a seventh valve located between the first thermal source and the first end of the second heat exchanging conduit;

- an eighth valve located between the second end of the second heat exchanging conduit and the first thermal source.

4. An apparatus according to claim 3 wherein the plurality of cooperating valves are solenoid valves.

5. An apparatus according to claim 3 wherein the ends of the conduits are attached to the thermal sources by fluid lines for conducting the fluid.

6. An apparatus according to claim 3 wherein the plurality of cooperating valves includes a controller for alternating the plurality of cooperating valves between the first and second operating positions, the controller being adapted to open the first, second, third and fourth conduits and to close the fifth, sixth, seventh and eight conduit in the first operating position, the controller being further adapted to close the first, second, third and fourth conduits and to open the fifth, sixth, seventh and eight conduit in the second operating position.

7. An apparatus according to claim 5 further comprising a circulation pump operatively connected to the fluid lines for circulating said fluid.

8. An apparatus according to claim 2 further comprising a cylinder housing a piston, the piston being coupled to said pressure driven actuator for transferring said reciprocal motion to the piston.

9. An apparatus according to claim 8 wherein the piston is coupled to a flywheel for generating electrical energy.

10. An apparatus according to claim 9 wherein the flywheel is operatively connected to a generator.

11. An apparatus according to claim 2 wherein the pressure driven actuator is coupled to a rotary actuator.

12. An apparatus according to claim 1 wherein the thermal sources are either the same or different, the thermal sources being selected from the group consisting of ambient outside air, water, and soil, solar energy sources and geothermal energy sources.

13. An apparatus according to claim 2 wherein the heat-exchanging conduit includes multiple coils of copper tubing.

14. An apparatus according to claim 1 wherein the gas under pressure is selected from the group consisting of helium, nitrogen and air.

15. A method for converting a differential in thermal energy to kinetic energy comprising the following steps:

- providing first and second vessels containing a gas under pressure, the gas under pressure being of a temperature T;
- providing a first thermal source and a second thermal source, the first thermal source housing a thermal transfer fluid of a temperature above T and the second thermal source housing a thermal transfer fluid of a temperature below T.
- delivering the thermal transfer fluid from the first thermal source to the first vessel thereby raising the pressure of the gas in the first vessel;
- delivering the thermal transfer fluid from the second thermal source to the second vessel thereby lowering the pressure of the gas in the second vessel;
- delivering gas under pressure from the first vessel to a pressure activated actuator and applying suction from the second vessel to the pressure activated actuator thereby causing the pressure activated actuator to move in a first direction.

16. A method according to claim 15 further comprising the following steps:

- providing a generator; and

- operatively connecting the actuator to the generator for generating electrical energy.

17. A method according to claim 16 wherein the pressure activated actuator is a piston that is moveable in the cylinder.

18. A method according to claim 15 further comprising the steps of:

- delivering the thermal transfer fluid from the second thermal source to the first vessel thereby lowering the pressure of the gas in the first vessel;

- delivering the thermal transfer fluid from the first thermal source to the second vessel thereby raising the pressure of the gas in the second vessel;

- delivering gas under pressure from the second vessel to the pressure activated actuator and applying suction from the first vessel to the pressure activated actuator thereby causing the pressure activated actuator to move in an opposite direction to the first direction.

19. A method according to claim 15 further comprising the steps of providing a plurality of cooperating valves and regulating a flow of thermal conducting fluid from the first and second thermal sources to the first and second vessels.

20. A method according to claim 15 further comprising the step of providing a circulation pump for delivering the thermal transfer fluid from the first and second thermal sources to the first and second vessels.